

Relation of Form Length to Response in Mailed Epidemiologic Inquiries

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COMMON SENSE suggests that the quality of epidemiologic data collected by mail would be improved by minimizing the amount of information requested. Sirken and associates (1) found that a longer form required more followup requests, although it eventually achieved the same high level of response as a shorter version. This report describes investigations of an epidemiologic form for effects of form length on quality of response.

Study Method

In November 1963 the National Heart Institute, Public Health Service, conducted a pilot study of six forms required for an epidemiologic study of comparative mortality among samples of British and Norwegian immigrants to the United States and U.S. native-born controls. The method used was basically that developed by Sirken and associates (2).

Samples of the British, Norwegian, and native U.S. populations were each divided into two groups of equal size. Decedents with even study numbers were assigned a long version of the study form and those with odd numbers were assigned a short version. All questions considered not absolutely essential to the basic purpose of the study were omitted from the short forms. Both short and long forms were printed on single sheets of paper folded into four-page leaflets. The first page of each contained similar letters of explanation. The remaining 3 pages of the long forms were covered with 90 closely spaced questions. The shorter forms, on the other hand, contained 44 ques-

tions, more widely spaced, on only 2 pages. Forms concerning the British and Norwegian immigrants were identical in format and length, whereas the forms for U.S. natives were somewhat shorter because of the omission of questions referring to habits and residences before migration to this country. (Copies of these forms are available from the author upon request.)

These forms were sent to informants (usually the nearest surviving relative) listed on death certificates which had been selected from New York City and 11 States: California, Illinois, Massachusetts, Michigan, Minnesota, New Jersey, North Dakota, Ohio, Pennsylvania, Washington, and Wisconsin. The death certificates from the 12 areas concerned (a) all deaths of persons born in Norway, aged 30 through 74, that occurred in December 1962 and 11 deaths of Norwegian immigrants, aged 30 through 74, from Minnesota that occurred in November 1962; (b) every third death of persons born in England, Scotland, and Wales, aged 30 through 73, that occurred in December 1962; and (c) every 150th death of white U.S. native-born persons, aged 30 through 73, that occurred in December 1962.

The purpose of the forms was to obtain, for each decedent, information on places of residence, kinds of work, tobacco usage, height, and weight. The long forms included additional questions on decedent's previous residences, physical activity, inhalation during smoking, weight at several different ages during his lifetime, age and dates of birth and death for both parents, and home-heating and window-opening habits.

From September 30 through October 10, 1963,

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a total of 458 forms were mailed to the informants listed on 506 death certificates. Allocation to the long-form or short-form groups was made before the certificates were examined for usable informant names. The forty-eight certificates with no usable names account for the fact that only 231 short forms and 227 long forms were mailed. Of the 458 forms, 169 concerned British decedents, 127 Norwegian decedents, and 162 U.S. native decedents. If a form was not returned within 2 weeks, a second form was mailed with a second-request letter. After another 2 weeks, a third and final request was made, by certified mail, of those still not responding. The last form returned was received 127 days after the initial mailing.

Forty-five forms were returned undelivered by the post office and are excluded from the denominators in subsequent analyses of response rates. Reasons for these postal returns were that 17 addressees were unknown at the address, 9 had moved without leaving a forwarding address, 9 had neglected to claim the letters at their post office, 7 had inadequate addresses, and 3 addressees had died.

Form length was investigated for its possible effects on the overall response to the form, the number of mailings needed per response, the

proportion of questions answered, and the composite rate of response to both form and questions.

The random-sampling scheme used gives reasonable assurance that the many variables which may affect response rates were distributed equally to the short- and long-form groups and should make it unnecessary to consider additional variables in this report. The reasons the country of birth of the decedent has been included are that it was critical to the primary concerns of the study; its influence on response can be compared with that of form length; and it was not included by Sirken and associates in their report (1). Any effects of the birthplace of decedent on responses, however, may have had less to do with decedent's actual birthplace than with such factors as his age, his place of death, the relationship of informant to decedent, and the like, factors which vary among the three nativity groups of decedents and have not been considered in this report.

Results

Overall response to form. Of the short forms, 87.3 percent were returned with at least some usable information (table 1). Of the long forms, 84.7 percent were so returned. This

Table 1. Response by kind of form

Kind of form	Forms mailed and delivered							Number of forms mailed but undeliverable ²
	Total number	Returned with usable information		Returned without usable information ¹		Nonresponse		
		Number	Percent	Number	Percent	Number	Percent	
Short.....	204	178	87. 3	9	4. 4	17	8. 3	27
British.....	70	61	87. 1	7	10. 0	2	2. 9	15
Norwegian.....	57	53	93. 0	1	1. 8	3	5. 3	5
United States.....	77	64	83. 1	1	1. 3	12	15. 6	7
Long.....	209	177	84. 7	12	5. 7	20	9. 6	18
British.....	73	58	79. 5	6	8. 2	9	12. 3	11
Norwegian.....	61	54	88. 5	2	3. 3	5	8. 2	4
United States.....	75	65	86. 7	4	5. 3	6	8. 0	3
All.....	413	355	86. 0	21	5. 1	37	9. 0	45
British.....	143	119	83. 2	13	9. 1	11	7. 7	26
Norwegian.....	118	107	90. 7	3	2. 5	8	6. 8	9
United States.....	152	129	84. 9	5	3. 3	18	11. 8	10

¹ Includes 4 refusals and 17 forms returned blank with explanatory notes.

² Includes 17 addressees unknown at address, 9 who had moved without a forwarding address, 9 whose forms were never claimed from the post office, 7 who had inadequate addresses; and 3 who had died.

Table 2. Mailings required to achieve return of forms with usable information by kind of form

Kind of form	Forms returned with usable information						
	Total	Before 2d mailing		Between 2d and 3d mailings		After 3d mailing	
		Number	Percent	Number	Percent	Number	Percent
Short-----	178	84	47.2	63	35.4	31	17.4
British-----	61	31	50.8	19	31.1	11	18.0
Norwegian-----	53	27	50.9	18	34.0	8	15.1
United States-----	64	26	40.6	26	40.6	12	18.8
Long-----	177	70	39.5	69	39.0	38	21.5
British-----	58	22	37.9	22	37.9	14	24.1
Norwegian-----	54	30	55.7	18	33.3	6	11.1
United States-----	65	18	27.7	29	44.7	18	27.7
All-----	355	154	43.4	132	37.2	69	19.4
British-----	119	53	44.5	41	34.5	25	21.0
Norwegian-----	107	57	53.3	36	33.6	14	13.1
United States-----	129	44	34.1	55	42.6	30	23.3

difference is not significant at the 0.05 level, the level of significance used in the remainder of this report. The slight differences according to form length in the other two response categories, returned without usable information (includes four written refusals) and nonresponse, were also not significant.

There were larger, but still not statistically significant, differences in overall response to the forms according to nativity of decedent. Of the forms concerning Norwegian decedents, 90.7 percent were returned with usable information as compared with 84.9 percent of those concerning U.S. decedents and only 83.2 percent of those concerning British decedents. The main reason for these differences appears to be the larger proportion of forms returned without usable information by informants for British decedents, 9.1 percent as compared with 3.3 percent by informants for U.S. native decedents and 2.5 percent by informants for Norwegian decedents.

When form length is examined for each of the nativity groups individually, informants for the groups are seen to vary in their reactions to length. Informants for the British returned long forms with usable information at a rate 7.6 percent less than they did the short forms; the U.S. informants, however, returned long forms with usable information at a rate 3.6 percent

more than short forms. The differences among the nativity groups in the proportions returning long and short forms without usable information were smaller. Larger differences among the nativity groups in response to the two lengths are apparent in the nonresponse category. Informant nonresponse for British decedents increased from 2.9 percent for short forms to 12.3 percent for long forms, a difference of 9.4 percent; informant nonresponse for Norwegian decedents on long forms was only 2.9 percent greater than that for the short forms; whereas informant nonresponse for U.S. native decedents decreased by 7.6 percent, from 15.6 percent for short forms to 8.0 percent for long forms.

Mailings needed to elicit response. Table 2 shows that the percent of short forms for all decedent nativity groups returned after one mailing (within 2 weeks) was 47.2; an additional 35.4 percent were returned after two mailings (4 weeks); another 17.4 percent, after three mailings (6 weeks or more). For the long forms, the corresponding percentages were 39.5, 39.0, and 21.5. Informants receiving (and returning) long forms took an average of 1.82 ± 0.06 (standard error) mailings to respond, and those receiving short forms, 1.70 ± 0.06 . The difference is too small to be statistically significant.

In speed of response, informants for the three nativity groups (combining form-length groups) differed significantly from one another. Informants for Norwegians were the most rapid responders. Their response record was 53.3 percent after one mailing, 33.6 percent after two mailings, and 13.1 percent after three mailings. Slowest were the informants for U.S. native-born decedents, whose corresponding percentages were 34.1, 42.6, and 23.3. Informants for the British decedents were intermediate in speed of response. Informants for U.S. native-born decedents required 1.89 ± 0.07 mailings per response; those for the British, 1.76 ± 0.07 ; and those for the Norwegian, 1.60 ± 0.07 .

The differences among the nativity groups in numbers of mailings required to elicit a response are accounted for by differences in response to the long form. For long forms, the response after the first, second, and third mailings was 37.9 percent, 37.9, and 24.1 for informants for British decedents; 55.7 percent, 33.3, and 11.1 for informants for Norwegian decedents; and

27.7 percent, 44.7, and 27.7 for informants for U.S. native-born decedents. Informants for Norwegian decedents responded as quickly to long as to short forms; the other two groups took longer to respond to the long forms than to the short. The informants for the Norwegians responded more quickly than the other two groups to the long forms. The U.S. respondents to long forms required an average of 2.00 ± 0.09 mailings before responding, or 28 percent more than the 1.56 ± 0.10 required by the Norwegian respondents.

Proportion of questions answered. Of the 27 questions common to all forms, 91.8 percent were answered on the long forms and 92.3 percent, on the short forms (table 3). The percent of questions answered on the six different forms varied from 89.7 to 93.4, but none of the differences between the six forms or between the groups of forms were statistically significant.

Composite response to questions and forms. The relative results of the composite evaluation of form effectiveness, based on both the question-response rate and the form-response rate, differ from those based on the form-response rate alone only in that there is slightly less variation among the six forms (table 3, last column).

Table 3. Response to 27 questions common to all forms for 355 forms returned with usable information, by kind of form

Kind of form	Questions			Question-form response (percent) ²
	Total number ¹	Answered		
		Number	Per cent	
Short-----	3, 581	3, 304	92. 3	80. 6
British-----	1, 257	1, 172	93. 2	81. 2
Norwegian-----	1, 062	953	89. 7	83. 4
United States-----	1, 262	1, 179	93. 4	77. 6
Long-----	3, 588	3, 293	91. 8	77. 8
British-----	1, 236	1, 132	91. 6	72. 8
Norwegian-----	1, 084	1, 000	92. 3	81. 7
United States-----	1, 268	1, 161	91. 6	79. 4
All-----	7, 169	6, 597	92. 0	79. 1
British-----	2, 493	2, 304	92. 4	76. 9
Norwegian-----	2, 146	1, 953	91. 0	82. 5
United States-----	2, 530	2, 340	92. 5	78. 5

¹ Only when a positive response to a question, such as "Did the deceased smoke cigarettes. . .," created the need for answers to additional detail questions, such as "Did the deceased inhale. . .," were such additional detail questions included as questions requiring answers.

² Product of preceding column and the 3d column of table 1 (percent returned with usable information).

Discussion

This study suggests that there is considerable flexibility in the amount of standard demographic or epidemiologic data that can be successfully obtained by questionnaire from informants listed on death certificates in the United States. Donald (3) has indicated that response rates to mailed questionnaires tend to be high when respondents have special interest or involvement in the areas covered and when respondents are associated in some way with the organization sponsoring the study. Perhaps presenting questions about health satisfied the first requirement, and sponsorship of the project by a health research agency of the Federal Government may have satisfied the second. Had questions of a more sensitive kind been included in the forms or had the length of the forms differed more appreciably, it is likely that response rates would have eventually been affected.

That the British and U.S. groups reacted to the longer form by taking longer to respond and possibly by changing their manner of non-response suggests that the increase in length of the form had some minor effect. Differences may possibly also exist between the short and long forms in the accuracy of the data obtained or in other ways not examined in this study. In a study of the relationship between the "mailing wave" and "adequacy" of response (completeness plus internal consistency of the information returned), Sirken and Brown (4), for example, found that the information returned became less adequate as the mailing waves increased. In the present study, where long forms required more mailings to elicit response but were not significantly less complete than the short forms, no attempt was made to evaluate the internal consistency of responses.

The 9 percent overall nonresponse rate in this pilot study is similar to the 10 percent rate achieved with comparable mailing procedures in the Pennsylvania mortality study (1).

Summary

A long version (90 questions) or a short version (44 questions) of an epidemiologic form requesting information on health-related habits of decedents was mailed to informants (usually the nearest relative) listed on the death certificates of 169 British and 127 Norwegian migrants to the United States and to 162 informants for persons born in the United States.

When all three decedent nativity groups were combined, response rates for the two form lengths did not differ appreciably. When the two form-length groups were combined, the differences among the nativity groups were also not significant (0.05 level).

When the three decedent groups were exam-

ined separately for effect of form length, significant differences were noted. For both British and Norwegian decedents, response to the long form was poorer than to the short, but for U.S. native decedents, response to the long form was slightly better than to the short.

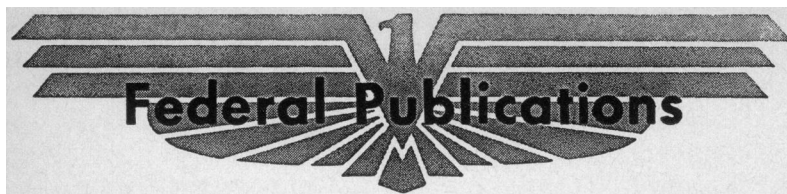
In mailings required to obtain response, results for the two form lengths again did not differ significantly when the nativity groups were combined. When the two form-length groups were combined, however, the nativity groups differed significantly. Informants for British decedents required 1.76 mailings to respond, those for Norwegians 1.60 mailings, and those for U.S. natives 1.89 mailings. These nativity differences consisted principally of differences in reactions to the long form.

The informant groups did not significantly differ in the number of questions they answered.

Doubling the number of questions therefore did not significantly affect overall response but affected response within the three decedent nativity groups in different ways.

REFERENCES

- (1) Sirken, M. G., Pifer, J. W., and Brown, M. L.: Survey procedures for supplementing mortality statistics. *Amer J Public Health* 50: 1753-1764, November 1960
- (2) Sirken, M. G., Pifer, J. W., and Brown, M. L.: Design of surveys linked to death records. National Vital Statistics Division, National Center for Health Statistics, Public Health Service. U.S. Government Printing Office, Washington, D.C., September 1962.
- (3) Donald, M. N.: Implications of nonresponse for the interpretation of mail questionnaire data. *Public Opinion Quart* 24: 99-114 (1960).
- (4) Sirken, M. G., and Brown, M. L.: Quality of data elicited by successive mailings in mail surveys. *Proceedings of the Social Statistics Section of American Statistical Association*, 1962, pp. 118-125.



Health Materiel and Facilities Planning Guide for Emergency Management. *PHS Publication No. 1071-A-4; 1965; 43 pages.*

Gives guidance in developing organizational structures, assessing damage and evaluating resources, and estimating requirements for health materiel and supporting services. Presents emergency assumptions, channels of claimancy and allocation of health resources. Defines and illustrates primary and secondary resources. Provides a planning guide for facilities and a checklist for materiel planners. Includes an appendix which covers the structure and functions of the Federal Emergency Health Service.

This planning guide is designed to assist regional and State resource management planners in developing coordinated plans to meet a national emergency. It will also be of value to hospital administrators and producers and distributors of health supplies and equipment.

Directory of Biomedical Institutions in the Union of Soviet Socialist Republics. *PHS Publication No. 1354; 1965; 344 pages; \$2.* A guide to the organization, scope, and geographic distribution of Soviet biomedical institutions. Provides an alphabetical listing of 1,569 institutions. Includes a geographic index and a classified index by category of institution.

Kidney Diseases. A guide for public health personnel. *PHS Publication No. 1384; 1965; 31 pages; 25 cents.* Discusses the anatomy, physiology, and pathology of the kidney as a basis for understanding new public health programs in kidney disease areas. Suggests public

health programs that might be undertaken at the local or State level to decrease the morbidity and mortality from diseases of the kidney. Brochure should be of special interest to health personnel who desire additional background and understanding of the basic nature of kidney function and how this function is altered by disease.

Grants for Migrant Family Health Services. *PHS Publication No. 971; 1965; leaflet.* Explains how amended migrant health legislation authorizes the Public Health Service to make grants to pay part of the cost of family health service clinics and other activities to improve health services for domestic migratory farmworkers and their families, including necessary care in short-term general hospitals. Gives examples of public agencies and nonprofit private organizations eligible to apply for grants. Outlines the types of activities sought, criteria for reviewing applications, and how and where to apply for grants.

Hospital Planning for Nuclear Disaster. *PHS Publication No. 1071-G-1; 1965; 68 pages, 25 cents.* Describes the most important actions to be taken to prepare hospitals for nuclear disaster. Many aspects of disaster preparations are equally valuable in coping with major natural disasters. Discusses the preparation of a written disaster plan, shelter protection for staff and patients, capacity expansion and allocation of space, planning for possible evacuation and relocation, and the use of the packaged disaster hospital and other emergency facilities. Includes a sample written plan, "Technical Requirements for

Fallout Shelters in Hospitals," originally published by the Office of Civil Defense, and a bibliography of emergency health planning manuals.

Health Education Films for Seasonal Farm Workers. *PHS Publication No. 1387; 1965; leaflet.* Describes three short health education films, "A Healthier Place to Live," "Keep Clean—Stay Well," and "Safe Food," designed for use with seasonal crop workers and their families. Emphasizes the importance of clean surroundings, personal cleanliness, and safe food preparation and storage. Presents a Spanish-American cast, Spanish or English language, color or black and white and a southern Negro cast, English language, black and white.

A Study of Hospital Central Medical and Surgical Supply Service. *PHS Publication No. 930-C-10; 1965; by John R. McGibony, Marie M. Lech, and Ella H. Davis; 41 pages; 30 cents.* Reports a study of the functioning of the central medical and surgical supply services in 251 non-Federal short-term hospitals. Discusses organization, scope of services, physical facilities and equipment, and problems in operation. Presents suggestions for planning and organizing these services.

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